

REMARKS

Amendments to claims 1, 14, 31, 36-39, 42, 44, and 45 are for the purpose of clarifying what Applicants regard as the invention. Amendment to claim 33 is to change claim dependency. No new matter has been added.

I. CLAIM REJECTIONS UNDER U.S.C. § 102

Claims 1, 3, 31-39, 42-49, and 54 stand rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Application Publication No. 2003/0048868 (Bailey). Applicants respectfully note that in order to sustain a rejection under § 102, each element in the rejected claim must be found, either expressly or inherently, in the cited reference.

Claims 1 and 14

Claim 1 recites *determining a radiation treatment plan* using configuration and radiation absorption data, wherein the configuration data and radiation absorption data are determined using first and second images formed by respective first and second beams having respective first and second energy levels (Emphasis added). Claim 14 recites similar limitations. Applicants respectfully submit that Bailey does not disclose or suggest determining a radiation treatment plan in the manner recited in claims 1 and 14.

According to the Office Action, paragraphs 33 and 43-51 allegedly disclose determining a radiation treatment plan using configuration data and radiation absorption data. However, paragraph 33 discloses creating images during a treatment planning phase, and does not disclose or suggest creating a treatment plan using configuration data and radiation absorption data, wherein the configuration data and radiation absorption data are determined using first and second images formed by respective first and second beams having respective first and second energy levels.

Also, paragraphs 43-47 actually disclose:

[0043] The imaging subsystem 12 can be used in the planning stage using standard CT techniques by positioning the patient on table 60 in the aperture 20 with the target region position close to the isocenter 16. When using the imaging system one or both of the X-ray sources 22A and 22B can be used. With one source 22 the chosen source is used to emit the X-ray beam 30 toward the detector array 24 as the source and array rotate about the rotation axis 26. Similarly, both X-ray sources can be used to acquire CT data. In this latter case, the X-ray sources can share the detectors of the array 24 by being alternatively switched so that when one X-ray source is emitting X-rays, the other is not. By switching back and fourth at a high rate, the amount of data provided by the detector array from each source can be utilized.

[0044] Each of the sources can provide a single energy beam or a dual energy beam (by being alternatively switched) for improved scanning imaging results.

[0045] Alternatively, as shown in FIG. 3, each source 22A and 22B may be offset along the Z-axis direction and the array of detectors can include two rows 24A and 24B, one for each source. In this arrangement data acquired from each row is acquired from exposure from a different source, and separate sets of data can be acquired using the two sources at the same time. The imaging fan beam emitted from each source preferably intersect in the area of interest, which is preferably the area represented by the radiation window 52 defined by the radiotherapy subsystem.

[0046] When using both sources 22A and 22B to acquire CT data, dual energy imaging techniques can be employed with one source providing a high energy imaging beam and the other a low energy imaging beam; or where the two sources provide imaging beams to separate rows of detectors, they each can be single energy or dual energy for improved scanning imaging results.

[0047] Multiple sliced images can be obtained by moving the patient table 60 in increments in the Z-axis direction so that images can be made of the target region of the patient 62 and its surrounds. *These images can be used to plan treatment with the radiotherapy subsystem 14.*

(Emphasis Added)

As such, the cited passages disclose generating images using source 22A and 22B during a planning phase. Notably, paragraph 47 of Bailey describes that the generated images “can be used to plan treatment”, but does not describe how the treatment is planned. In fact, there is nothing in paragraphs 43-47 that describes determining a treatment plan in the manner recited in claims 1 and 14.

In addition, paragraphs 48-51 actually describe a radiotherapy phase in which treatment beam is delivered based on a treatment plan, and therefore, do not disclose or suggest determining a radiation treatment plan, much less, determining a treatment plan in the manner described in claims 1 and 14.

Further, according to the Office Action, Bailey allegedly implies updating and modifying the course of treatment because paragraph 53 of Bailey states that images are compared to “maximize treatment.” Applicants respectfully disagree. Paragraphs 49-53 describe aligning a target region using generated images so that radiation beam can be delivered accurately. It is understood that this is how maximization of treatment is accomplished within the context of Bailey. As such, there is nothing in Bailey that discloses or suggests determining a treatment plan in the manner described in claims 1 and 14.

For at least the foregoing reasons, claims 1 and 14, and their respective dependent claims, are believed allowable over Bailey.

Claims 31 and 42

Claim 31 has been amended to recite determining a treatment plan, wherein the treatment plan is determined *after* the object is illuminated by the radiation beam that is at a MeV energy level (Emphasis Added). Claim 42 has been amended to recite similar limitations. Bailey does not disclose or suggest such limitations. Rather, Bailey discloses first determining a treatment plan (paragraphs 43-47), and then delivering a radiotherapy beam using the radiation source 40 (paragraphs 50-52). Notably, the radiation source 40, which is understood as being configured to deliver radiation beam having MeV energy level, is not used during the planning phase. For at least the foregoing reason, claims 31 and 42, and their respective dependent claims, are believed allowable over Bailey.

Claim 45

Claim 45 has been amended to recite a beam adjuster comprising a multi-leaf collimator, wherein the beam adjuster is in front of a multi-energy source. Bailey does not disclose or suggest such limitations. According to the Office Action, paragraph 45 of Bailey allegedly suggests a beam adjuster because a fan beam (from source 22) is formed by adjusting a spread of an x-ray beam. Applicants respectfully submit that a fan beam can be generated without using a beam adjuster, and therefore, a disclosure of a “fan beam” does not automatically suggest that a beam adjuster is used. However, to further distinguish from Bailey, claim 45 has been amended to clarify that the beam adjuster comprises a multi-leaf collimator. In particular, Applicants respectfully note that there is nothing in Bailey that discloses or suggest a multi-leaf collimator that is placed in front of the multi-energy radiation source 22. For at least the foregoing reason, claim 45 and its dependent claims are believed allowable over Bailey.

II. CLAIM REJECTIONS UNDER U.S.C. § 103

Claims 1, 4, 6-12, 14-17, and 55-58 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Bailey in view of U.S. Patent No. 5,661,773 (Swerdloff).

Claim 1 recites determining a radiation treatment plan before or during a treatment session using the configuration data and the radiation absorption data. Claim 14 recites a similar limitation. Applicants respectfully submit that neither Bailey nor Swerdloff discloses such limitation. As discussed, Bailey does not disclose or suggest determining a radiation treatment plan using configuration data and radiation absorption data as described in claims 1 and 14. Swerdloff also fails to disclose or suggest the above limitation. In particular, Swerdloff teaches modifying an error dose after a therapy session (see column 17, line 45 to column 18, line 43). As such, to the extent that modifying an error dose is analogized as determining a treatment plan, Swerdloff in fact teaches away from determining a radiation treatment plan before or during a treatment session. For at least the foregoing reasons, claim 1 and its dependent claims are believed allowable over Bailey, Swerdloff, and their combination.

Claims 18-24 and 26-30 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Bailey in view of Swerdloff, and further in view of U.S. Patent No. 6,618,467 (Ruchala).

Claim 18 recites determining configuration data and radiation absorption data using an image generated using a MeV energy level beam. Claim 26 recites a similar limitation. Bailey discloses using an imaging subsystem 12 to generate an image for obtaining configuration data (paragraphs 48 and 49), but does not disclose or suggest using the *same generated image* (i.e., from which configuration data is obtained) to obtain radiation absorption data. Instead, radiation absorption data is obtained from another image generated using detector array 42 (paragraph 54). Ruchala fails to make up the deficiencies present in Bailey. According to the Office Action, column 1, line 56 to column 2, line 14 of Ruchala discloses imaging beams that are in the kilovoltage range and megavoltage range. However, even if such feature of Ruchala were to be combined with the system of Bailey, the purported combination would not form the claimed subject matter, namely, determining configuration data and radiation absorption data using *an* image, even less, an image formed by a MeV energy level beam, as recited in claims 18 and 26. Swerdloff teaches obtaining radiation absorption data, and not configuration data (column 17, line 45 to column 18, line 43), and therefore, also does not disclose or suggest the above limitation. For at least the foregoing reasons, claims 18 and 26, and their respective dependent claims, are believed allowable over Bailey, Swerdloff, Ruchala, and their combination.

III. SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Applicants submitted a Supplemental Information Disclosure Statement on June 28, 2005. However, we have not yet received confirmation that reference numbers 1-3 listed on form PTO/SB/08A and reference number 1 listed on form PTO/SB/08b have been initialed and considered. Attached hereto is a copy of the forms PTO/SB/08a (1 pg.) and PTO/SB/08b (1 pg.). Applicants hereby respectfully request that the references listed on forms PTO/SB/08A and PTO/SB/08b be initialed and considered by the Examiner.

CONCLUSION

Based on the foregoing, all remaining claims are believed in condition for allowance. If the Examiner has any questions or comments regarding this amendment, please contact the undersigned at the number listed below.

The Commissioner is authorized to charge any fees due in connection with the filing of this document to Bingham McCutchen's Deposit Account No. 50-2518, referencing billing number **7010742001**. The Commissioner is authorized to credit any overpayment or to charge any underpayment to Bingham McCutchen's Deposit Account No. 50-2518, referencing billing number **7010742001**.

Respectfully submitted,
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